



RESIDENTIAL ELECTRICAL PANEL REPLACEMENT

An electrical permit is required for replacement and upgrade of the main electrical service panel prior to installation of the new panel.

Permit Issuance

Electrical panel replacement permits can be obtained on-line at www.e-OneStop.net or at the One-Stop Permit Center. Following are the standard requirements and general information followed by an illustration of the panel requirements:

- **General Requirements** - The main electrical service shall be installed with rigid conduit. Electrical metallic tubing may be used where the service drop is attached to the building. The service entrance cable may be used, provided the approved fittings are used with the cable, such as a rain-tight service head or forming the cable goose-neck, taped or painted, and held securely in place by a fitting approved for the purpose.

The minimum size service conduit shall be 1-1/4". The minimum size service entrance wire shall be rated 100 amperes minimum if the load is 10 kW or more, or has more than 6 two-wire branch circuits. A larger service may be required for new homes or additions to existing homes.

Service Entrance Conductors (Wires) – Conductors shall have a vertical clearance of not less than 8' above the roof surfaces. The service head shall be so located that the service drops together with the open wires between the service head and service drop will have a minimum clearance of 10' vertically above ground and three feet radius from doors and windows.

Conductors and cables exposed to direct sunlight, including overhead service conductors, shall be listed and marked as "sunlight resistant." Service entrance conductors and conduit shall be sized as follows:

SERVICE ENTRANCE CONDUCTORS SIZE AND RATING			
Service or Feeder Rating	Copper Conductors	Aluminum or Copper-Clad Aluminum	Minimum Conduit Size
100 Amps	#4 AWG	#2 AWG	1 inch
125 Amps	#2 AWG	#1/0 AWG	1 inch
150 Amps	#1 AWG	#2/0 AWG	1 ¼ inch
200 Amps	#2/0 AWG	#4/0 AWG	1 ½ inch

- **Meter location** - The height of the meter shall be between 48" and 66" above the ground.
- **Working space** - The clear working space in front of the panel shall be 30" wide by 36" deep with a minimum headroom clearance of 6'-6".

- **Grounding of Services** - Grounding of the electrical service is required when the electrical panel is replaced. Grounding shall consist of a continuous grounding conductor run from the panel to a ground rod (grounding electrode) and to the cold water pipe. Grounding of the electrical service at the main water line must be within the first 5' of water piping into the building. The underground water service shall not be used as the grounding electrode.

For existing structures and additions not affecting the main electrical service panel location, the grounding electrode shall be nonferrous (copper), listed, and not be less than ½" in diameter. The electrode shall be installed such that at least 8' of length is in contact with the soil. The upper end of the electrode shall be flush with or below ground level unless the above-ground end and the grounding electrode conductor attachment is protected against physical damage.

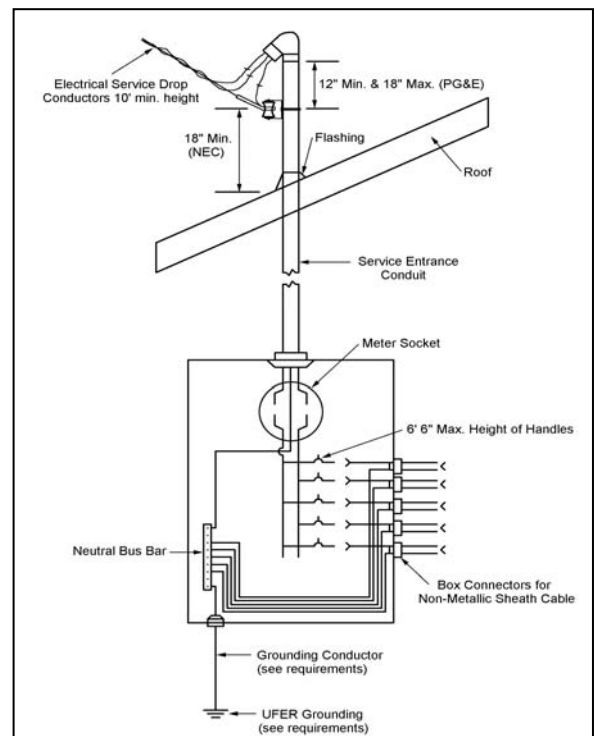
The required grounding electrode conductor (from electrode to panel) size is listed in the following table:

GROUNDING ELECTRODE CONDUCTOR SIZING		
Size of Main Panel	Copper Conductors	Aluminum or Copper-Clad Aluminum
100 Amps	#8 AWG	#6 AWG
125 Amps	#8 AWG	#6 AWG
150 Amps	#6 AWG	#4 AWG
200 Amps	#4 AWG	#2 AWG

- **Bonding** - Bonding of the hot, cold, and gas lines is required with the electrical panel is replaced. Bonding shall consist of a continuous bond jumper installed at the water heater between the hot, cold, and gas lines. The bonding jumper size shall be equal to the grounding conductor size.

Inspections Required

A minimum of two inspections are required, a utility release and a final. The utility release inspection should be scheduled when the new panel is installed and ready to be hooked up the PG&E supply. The building inspector will provide a utility release form which will need to be provided to PG&E to have the supply hooked up to the new panel. A wire lath inspection is required for stucco repairs. A final inspection should be scheduled after all of the work is complete.



If you have any questions, please call the City of Sunnyvale Building Division at (408) 730-7444. Information is also available on the Building Division web site at: www.sunnyvalebuilding.com.